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the so-called 'Indiera,' Indian types have persisted to a greater extent than elsewhere. I have not been able to find any definite indication of a difference in type; but I have measured only a few individuals from these districts. The material that I have been able to study comes from all parts of the island, but principally from the western-central part. The phenomena here described occur with equal intensity in all parts of the island.

The question of the degree of instability of human types seems to my mind an exceedingly important one for a clear understanding of the problems of physical anthropology. It would be particularly desirable to study the problem among immigrants living in different rural communities of the United States, and it would be even more desirable to have information in regard to the types that develop among the East Europeans and South Europeans who return to Europe and settle in their old geographical environment.

A REVISION OF THE ATOMIC WEIGHT OF TIN

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A recent investigation upon the atomic weight of tin by Briscoe,¹ in which stannic chloride was compared with pure silver, yielded a very concordant series of results, with an average value 118.698 (Cl = 35.457). This value has been adopted by the International Committee on Atomic Weights in preference to that found by Bongartz and Classen,² 119.0, which has been in general use for some time. Since the electrodeposition of cadmium and zinc in a weighed mercury cathode has been found to be a process capable of great accuracy,³ and since tin amalgam promised to be unusually well adapted for quantitative handling, this electrolytic method has been applied to the analysis of stannic chloride also.

In brief the method of operation was as follows: Pure tin was converted to tetrachloride by treatment with pure chlorine, and the tetrachloride was purified by fractional distillation. After weighed portions of the chloride had been dissolved in dilute hydrochloric acid, the metal was deposited electrolytically in a mercury cathode contained in a weighed glass cell similar to that previously described.⁴

Before converting the tin to tetrachloride it was freed as far as possible from acid-forming elements by twice transporting the metal electrolytically through an acid solution of stannous chloride, the anode

being an ingot of tin. This served at the same time to eliminate a large part of the copper and lead which were the chief metallic impurities. The product was fused in hydrogen on an alundum boat.

In preparing the tetrachloride special pains was taken to avoid exposing the substance to moisture. The ingots of metal were placed in a glass tube connected at one end with an apparatus for producing dry chlorine and at the other with a glass bulb containing a small quantity of tin. After the tube and bulb had been exhausted dry, chlorine was admitted and passed over the metal until it had been almost completely converted to chloride. The product was allowed to stand in contact with tin for some time to remove excess of chlorine and reduce lead tetrachloride, and was then fractionally distilled in vacuum at room temperature by condensing the product in bulbs cooled either with alcohol and solid carbon dioxide or with liquid air. First the most volatile fraction was removed with liquid air and rejected. The remainder was four times distilled, with rejection of a residue of about 15 grams in each case. Then two more fractions were eliminated with liquid air. The remainder was finally collected for analysis in a series of small bulbs. In the course of the distillation each fraction was sealed off from the rest of the apparatus as soon as collected. Two series of preparations were made, the procedure differing only slightly in the two cases.

The whole apparatus was constructed of glass, with sealed joints, the only glass stopcock was located between the tube containing the tin and the chlorine generator, and was lubricated with syrupy phosphoric acid. In place of stopcocks special glass valves devised by Briscoe were employed, in which a fused seal was broken when it was desired to open the valve.

The experimental procedure of an analysis was as follows: The glass bulb containing the stannic chloride was weighed in air, and again under water to find its displacement. Next the bulb was broken under about 75 cc. of 0.03 normal hydrochloric acid. The solution was then filtered into the weighed cell containing about 200 grams of mercury, and the glass was thoroughly washed with hydrochloric acid of the above concentration. The filter with the glass was burned in a weighed platinum crucible. Blank tests showed no appreciable quantity of glass to be dissolved in the process. The more concentrated washings were added to the main solution in the cell, the more dilute were evaporated with nitric and sulphuric acids in quartz. After nearly all the tin had been electrolytically deposited from the main solution, the residual electrolyte was concentrated, together with the evaporated wash-

ings, and the whole further electrolyzed. At the completion of the electrolysis the electrolyte was displaced successively with water and pure alcohol, both of which had been freshly saturated with hydrogen. To dry the amalgam the cell was placed in a small desiccator and the pressure reduced as far as possible. The electrolyte was evaporated, at first in a quartz dish, later in a weighed platinum crucible, and the residue heated gently. The weight of tin, computed upon the assumption that the residue was stannic sulphate, was added to that found in the amalgam. Although complete precipitation of the tin was never secured, the residue usually did not exceed 2 mg. in weight, and was never as much as 4 mg. Repetition of the electrolysis, after dissolving the residue in dilute sulphuric acid and returning it to the cell, sometimes caused a slight decrease in the weight of tin recovered. In all cases constant weight within 0.1 mg. was finally secured.

As a check upon the accuracy of this method of determining tin, in two experiments a weighed ingot of pure tin was electrolytically transported from the anode to the mercury cathode of the weighed cell. In one case a gain of 0.01 mg., in the other a loss of 0.06 mg. was observed. Such small changes are less than the probable error of weighing the cells.

The experimental data and the results calculated from them (assuming the atomic weight of chlorine to be 35.457) are shown in the following table. The weights of the bulbs containing the stannic chloride, of the glass and of the tin dissolved in the mercury are all corrected to vacuum.

Series	Fraction	Grams of SnCl_4	Grams of Sn	Ratio Sn:Cl_4	Atomic weight of Sn
I	5	11.64269	5.30498	0.837050	118.717
I	7	13.5943	6.1935	0.83687	118.691
I	8	10.0897	4.5971	0.83696	118.705
I	9	11.4319	5.2080	0.83677	118.678
I	11	12.2869	5.5983	0.83699	118.709
I	12	12.20889	5.56286	0.837020	118.713
I	13	10.7469	4.8965	0.83695	118.703
I	14	11.54233	5.25846	0.836818	118.684
			Average.....	0.836929	118.700
II	2	15.65437	7.13198	0.836852	118.689
II	3	16.23310	7.39664	0.837059	118.718
II	4	17.29151	7.87850	0.836980	118.707
II	7	15.04889	6.85695	0.837037	118.715
II	8	18.36074	8.36507	0.836869	118.692
II	9	21.58929	9.83676	0.836991	118.709
II	10	17.22210	7.84718	0.837040	118.716
II	11	15.70516	7.15589	0.837018	118.713
			Average.....	0.836981	118.707
				0.836955	118.703

The results for the atomic weight of tin are arranged in the order in which the fractions were distilled, not in the order of analysis. Since only slight irregular variations are apparent, there can be little question that the different portions were identical in composition.

The final average, Sn = 118.703 (Cl = 35.457) is in very close agreement with the one obtained by Briscoe by comparison with silver, 118.698. The percent of tin in stannic chloride found by us is 45.562, while Briscoe found 54.439% of chlorine. The sum is 100.001%, a highly satisfactory and convincing outcome.

It is a great pleasure to express our gratitude to the Carnegie Institution of Washington and to the Elizabeth Thompson Science Fund for very generous assistance in providing indispensable apparatus.

¹ *Trans. Chem. Soc.*, 107, 63 (1915).

² *Ber. D. Chem. Ges.*, 21, 2900 (1888).

³ Baxter and Hartmann, *J. Amer. Chem. Soc.*, 37, 113 (1915). Baxter and Grose, *Ibid.*, 38, 857, 868 (1916).

⁴ Baxter and Hartmann, these PROCEEDINGS, 1, 26 (1915).

FURTHER STUDIES OF NERVE CONDUCTION IN CASSIOPEA

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Studies of recent years have shown the importance of hydrogen ion concentration in determining the rate of nerve conduction in *Cassiopea*. Ordinary distilled water often remains acid even though air freed from CO₂ by means of soda-lime has been bubbled through it for 72 hours. Accordingly, Prof. George A. Hulett kindly arranged to have 144 litres of distilled water prepared in accordance with his well known method (*Ueber die Reinigung des Wassers durch Distillation, Zs. phys. Chem.*, 21, 287, 1896) in his laboratory at Princeton University. This water was sealed in 144 pyrex glass flasks and thus transported to Tortugas. The hydrogen ion concentration of each flask was tested separately, the range being 0.8 to 1.0 × 10⁻⁶, and the average being 0.9 × 10⁻⁶, or 6.04 PH.

Fifty litres of this water were placed in a green glass carboy which had previously held Merck's distilled water; and air freed from CO₂ was bubbled through it at an active rate for 78 hours, after which the water in the carboy had a PH. of 8.0 which it maintained for eight days while 139 experiments were made with it. The alkalinity then declined to 7.5 PH. while 26 other experiments were made; the average for the